

I claim:

1. A bag forming and sealing apparatus for forming a bag of predetermined length from a web of material, and said bag forming and sealing apparatus comprising:

5 a web forming section having a plurality of components arranged to fold the web into a continuous tubular web, said tubular web defining an interior and a longitudinal opening leading into said interior, said tubular web having an outer wall and overlapping flaps that straddle said longitudinal opening and extend into its said interior;

10 a web sealing section having web advancing apparatus to engage and advance said tubular web in a machine direction during an advance cycle and stop said tubular web during a stop cycle;

a longitudinal sealer movable between release and seal positions during said stop cycle, said longitudinal sealer having a floating sealer with a contoured  
15 heating element positioned between first and second platens, said floating sealer being biased away from said platens when in said release position to permit advancement of said tubular web during said advance cycle, said outer wall of said tubular web extending between said first platen and said floating sealer, and said overlapping flaps extending between said second platen and said floating sealer,  
20 said heating element pressing directly against one of said overlapping flaps when in said seal position, sufficient heat, pressure and time forming a contoured longitudinal seal between said flaps during said stop cycle, said longitudinal seal spanning less than the bag length to define a valve opening between said flaps; and,

25 a cross-sealer with at least one heating element to form spaced cross-seals across said tubular web, said tubular web being cut at predetermined spaced locations to form individual bags of the predetermined length.

2. The bag forming and sealing apparatus of Claim 1, and wherein said  
30 floating sealer has an elongated body of predetermined length extending in said

machine direction and having upstream and downstream ends, said upstream end being secured to said web sealing section to prevent lateral and longitudinal movement of said floating sealer, said contoured heating element extending along said length of said elongated body.

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3. The bag forming and sealing apparatus of Claim 2, and wherein said first platen is an upper platen with a generally downwardly facing horizontal surface, said second platen is a lower platen with a generally upwardly facing horizontal surface, and said elongated body of said floating sealer has generally upwardly and  
10 downwardly facing horizontal surfaces, said floating sealer being biased away from said upper platen by its own weight when in said release position.

4. The bag forming and sealing apparatus of Claim 3, and further including a biasing mechanism that biases said floating sealer away from engagement with  
15 said lower platen when said longitudinal sealer is in its said release position.

5. The bag forming and sealing apparatus of Claim 4, and wherein said biasing mechanism includes first and second magnets, said first magnet being secured to and moving with said floating sealer, and said second magnet being supported by  
20 said lower platen, said magnets being in registry with and repelling orientation to each other, said magnets biasing said floating sealer away from said lower platen when in said release position.

6. The bag forming and sealing apparatus of Claim 5, and wherein said upper platen is movingly driven into forced engagement with said floating sealer, said  
25 floating sealer and its said contoured heating element moving in slave relation with said upper platen to press against said overlapping flaps, said overlapping flaps being held in compressed engagement between said floating sealer and said lower platen when in said seal position.

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7. The bag forming and sealing apparatus of Claim 6, and wherein said secured upstream end of said floating sealer is secured to said lower platen by a flexing device, said flexing device preventing said lateral and longitudinal movement of said floating sealer relative to said tubular web and allowing said slave movement  
5 of said floating sealer relative to said upper platen.

8. The bag forming and sealing apparatus of Claim 2, and wherein said longitudinal sealer includes an isolator, said isolator extending substantially parallel to said floater sealer and between said heating element and said lower  
10 platen, said overlapping flaps being between said heating element and said isolator, and said overlapping flaps being compressed directly against said isolator when in said seal position.

9. The bag forming and sealing apparatus of Claim 4, and wherein said heating  
15 element and said longitudinal seal each have a contoured portion, said contoured portion of said longitudinal seal extending inwardly relative to said longitudinal opening to form a throat of said valve opening, said contoured longitudinal seal being substantially continuous through its entire extent.

20 10. The bag forming and sealing apparatus of Claim 1, and wherein the web of material has side edges, and wherein said web forming section has flap folding apparatus that fold first and second flap folds into the web, each of said flap folds being spaced a predetermined distance from one of said side edges of the web, said web folding apparatus aligning said flap folds in longitudinal registry to form said  
25 tubular web, and wherein said contoured heating element has a longitudinal portion aligned a predetermined distance inwardly from said flap folds, said longitudinal seal and said flap folds combining to form a gusset along the length of the bag.

11. The bag forming and sealing apparatus of Claim 2, and wherein said web  
30 advancing apparatus engages and advances said tubular web a predetermined

distance substantially equal to one bag length during each web advancing cycle, and maintains said tubular web in a taut condition during said advancing and sealing cycles.

5 12. A bag making apparatus for forming a bag of predetermined length from a continuous web of material, the web being folded into a tube having an interior and a longitudinal opening leading into the interior, the continuous tubular web having an outer wall and overlapping flaps that straddle the longitudinal opening and extend into its interior, said bag forming and sealing apparatus comprising:

10 web advancing apparatus that engages and advances the tubular web in a machine direction during an advance cycle and stops the tubular web during a seal cycle;

a longitudinal sealer movable between release and seal positions during said seal cycle, said longitudinal sealer having a floating sealer with a contoured  
15 heating element positioned between first and second platens, said floating sealer being biased away from said platens when in said release position to permit advancement of the web during said advance cycle, the outer wall of the tubular web extending between said first platen and said floating sealer, and the overlapping flaps extending between said second platen and said floating sealer,  
20 said heating element pressing directly against one of the overlapping flaps when in said seal position, sufficient heat, pressure and time forming a contoured longitudinal seal between the flaps during said seal cycle, said longitudinal seal spanning less than the bag length to define a valve opening between the flaps; and,

a cross-sealer with at least one heating element to form spaced cross-seals  
25 across the tubular web, the tubular web being separable at predetermined spaced locations to form individual bags of the predetermined length.

13. The bag making apparatus of Claim 12, and wherein said floating sealer has an elongated body of predetermined length extending in said machine direction and  
30 having upstream and downstream ends, said upstream end being secured to said

longitudinal sealer to prevent lateral and longitudinal movement of said floating sealer, said contoured heating element extending along said length of said elongated body.

5     14.     The bag making apparatus of Claim 13, and wherein said first platen is an upper platen with a generally downwardly facing horizontal surface, said second platen is a lower platen with a generally upwardly facing horizontal surface, and said elongated body of said floating sealer has generally upwardly and downwardly facing horizontal surfaces, said floating sealer being biased away from said upper  
10     platen by its own weight when in said release position.

15.     The bag making apparatus of Claim 14, and further including a biasing mechanism that biases said floating sealer away from engagement with said lower platen when said longitudinal sealer is in its said release position.

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16.     The bag making apparatus of Claim 15, and wherein said biasing mechanism includes first and second magnets, said first magnet being secured to and moving with said floating sealer, and said second magnet being supported by said lower platen, said magnets being in registry with and repelling orientation to  
20     each other, said magnets biasing said floating sealer away from said lower platen when in said release position.

17.     The bag making apparatus of Claim 16, and wherein said upper platen is movingly driven into forced engagement with said floating sealer, said floating  
25     sealer and its said contoured heating element moving in slave relation with said upper plate to press against the overlapping flaps, the overlapping flaps being held in compressed engagement between said floating sealer and said lower platen when in said seal position.

18. The bag making apparatus of Claim 17, and wherein said secured upstream end of said floating sealer is secured to said lower platen by a flexing device, said flexing device preventing said lateral and longitudinal movement of said floating sealer relative to the tubular web and allowing said slave movement of said floating sealer relative to said upper platen.

19. The bag making apparatus of Claim 13, and wherein said floating sealer includes an isolator, said isolator extending substantially parallel to said floater sealer and between said heating element and said lower platen, the overlapping flaps being between said heating element and said isolator, and the overlapping flaps being compressed directly against said isolator when in said seal position.

20. The bag making apparatus of Claim 15, and wherein said heating element and said longitudinal seal each have a contoured portion, said contoured portion of said contoured longitudinal seal extending inwardly relative to the longitudinal opening to form a throat of said valve opening, said contoured longitudinal seal being substantially continuous through its entire extent.

21. The bag making apparatus of Claim 13, and wherein said web advancing apparatus engages and advances the web a predetermined distance substantially equal to one bag length during each web advancing cycle; and,

further comprising a separating mechanism having a device for one of either perforating and cutting said tubular web at said predetermined spaced locations to form the bag.

22. A bag making apparatus for forming a bag of predetermined length from a continuous web of material, the web being folded into a tube having an interior and a longitudinal opening leading into the interior, the continuous tubular web having an outer wall and overlapping flaps that straddle the longitudinal opening and extend into its interior, said bag forming and sealing apparatus comprising:

web advancing apparatus that engages and advances the tubular web in a machine direction during an advance cycle and stops the tubular web during a seal cycle;

5 a longitudinal sealer movable between release and seal positions during said seal cycle, said longitudinal sealer having an elongated sealer with a contoured heating element positioned between first and second platens and in the interior of the tubular web, said platens being spaced from said elongated sealer when in said release position to permit advancement of the tubular web during said advance cycle, the outer wall of the tubular web extending between said first platen and said  
10 elongated sealer, and the overlapping flaps extending between said second platen and said elongated sealer, said heating element pressing directly against one of the overlapping flaps when in said seal position, sufficient heat, pressure and time forming a contoured longitudinal seal between the flaps during said stop cycle, said longitudinal seal spanning less than the bag length to define a valve opening  
15 between the flaps; and,

a cross-sealer with at least one heating element to form spaced cross-seals across the tubular web, the tubular web being separable at predetermined spaced locations to form individual bags of the predetermined length.

20 23. The bag making apparatus of Claim 22, and wherein one of said platens is movably mounted and one of said platens is substantially stationarily mounted, said movably mounted platen moving toward said elongated sealer when moving toward said seal position and away from said elongated sealer when moving toward said release position.

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24. The bag making apparatus of Claim 23, and wherein both of said platens are movably mounted, said platens moving toward said elongated sealer when moving toward said seal position, and said platens move away from said elongated sealer when moving toward said release position.

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25. The bag making apparatus of Claim 24, and wherein said elongated sealer is mounted to a substantially stationary portion of said longitudinal sealer and said elongated sealer remains in a substantially fixed position during said seal cycle.
- 5 26. The bag making apparatus of Claim 23, and wherein said elongated sealer has an elongated body of predetermined length extending in said machine direction, said elongated body having upstream and downstream ends, said upstream end being secured to said longitudinal sealer to prevent lateral and longitudinal movement of said elongated sealer, said contoured heating element  
10 extending along said length of said elongated body.
27. The bag making apparatus of Claim 26, and wherein said first platen is an upper platen with a generally downwardly facing horizontal surface, said second platen is a lower platen with a generally upwardly facing horizontal surface, and  
15 said elongated body of said elongated sealer has generally upwardly and downwardly facing horizontal surfaces, said elongated sealer being biased away from said upper platen by its own weight when in said release position.
28. The bag making apparatus of Claim 27, and further including a biasing  
20 mechanism that biases said elongated sealer away from engagement with said lower platen when said longitudinal sealer is in its said release position.
29. The bag making apparatus of Claim 28, and wherein said biasing mechanism floatingly biases said elongated sealer away from engagement with  
25 said lower platen when in said release position, said elongated sealer being a floating sealer.
30. The bag making apparatus of Claim 29, and wherein said biasing mechanism includes first and second magnets, said first magnet being secured to  
30 and moving with said floating sealer, and said second magnet being supported by



said lower platen, said magnets being in registry with and repelling orientation to each other, said magnets biasing said floating sealer away from said lower platen when in said release position: and,

5 further comprising a separating mechanism having a devices for one of either perforating and cutting said tubular web at said predetermined spaced locations to form the bag.

31. A bag forming process for forming a valve bag having a predetermined length, said bag forming process comprising the steps of:

10 providing a continuous web of material folded into a continuous tubular web having an outer wall that defines an interior, a longitudinal opening, and overlapping flaps straddling said longitudinal opening and extending into said interior, and providing a longitudinal sealer and a cross-sealer, said longitudinal sealer having an elongated sealer with a contoured heating element of  
15 predetermined longitudinal length;

advancing said tubular web into alignment with said longitudinal sealer, said elongated sealer being positioned in said interior of said tubular web, and said tubular web extending around said elongated sealer with said overlapping flaps adjacent said floating sealer;

20 stopping said advancement of said continuous tubular web;

cycling said longitudinal sealer from a release position to a seal position, said elongated sealer being forced into direct engagement with and applying pressure and heat to said overlapping flaps for a predetermined amount of time, said pressure, heat and time being sufficient to bond said flaps together to form a  
25 contoured longitudinal seal of predetermined longitudinal length;

cycling said longitudinal sealer back to its said release position, said longitudinal sealer releasing said continuous tubular web when in said release position;

advancing said continuous tubular web an incremental length substantially  
30 equal to the predetermined length of the bag, said predetermined incremental

length being longer than said predetermined longitudinal length of said longitudinal seal; and,

forming cross-seals at spaced locations relative to said longitudinal seal, one cross-seal being spaced from said longitudinal seal to define a valve opening, said tubular web being adapted to be separated at predetermined spaced locations to form the individual bags.

32. The bag forming process of Claim 31, and further comprising the step of: providing a web folding apparatus;

feeding said continuous web into said folding apparatus, said web having opposed longitudinal edges;

folding longitudinal flaps proximal each of said longitudinal edges of said continuous web, and folding said continuous web over onto itself to form said continuous tubular web, said longitudinal opening being along a longitudinal edge of said continuous tubular web, said folded flaps being in parallel side-by-side registry; and,

separating said tubular web at said predetermined spaced locations after forming said cross seals, said separation being by one of either cutting and perforating said tubular web to form the individual bags.

33. The bag forming process of Claim 31, and wherein said longitudinal sealer includes upper and lower platens, said elongated sealer being floatingly biased away from said lower platen when in said release position.

34. The bag forming process of Claim 31, and wherein said longitudinal sealer includes first and second platens, said platens moving toward said elongated sealer when moving toward said seal position, and said platens move away from said elongated sealer when moving toward said release position.